UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 27510

CSAH NO. 15

OVER THE

ARCOLA CHANNEL

DISTRICT 5 - HENNEPIN COUNTY

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 3512 (CEI 112)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge 27510, Piers 1 through 7, were generally in good condition below water with no defects of structural significance observed. Impact and/or ice related damage was evident at several of the piles at various locations above and below the waterline. The steel pipe pile casings typically exhibited coating failure with light to moderate corrosion and rust bleed-through near the waterline. The channel bottom around the substructure units appeared stable with no evidence of significant scour and no appreciable changes since the last inspection.

INSPECTION FINDINGS:

(A) The steel pipe pile casings typically exhibited coating failure with light to moderate surface corrosion with minor pitting up to 1/8 inch deep from 1 foot above to 1 foot below the waterline.

(B) Several of the steel pipe piles exhibited minor dents probably due to impact and/or ice related damage above and below the waterline.

(C) The concrete pile cap of Pier 7 exhibited areas of section loss approximately 1.5 feet long and 6 inches high on the west end with exposed reinforcing steel on the top and bottom edges.

RECOMMENDATIONS:

(A) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Daniel G. Stromberg

Date 6/30/2004 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.

Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 27510

Feature Crossed: The Arcola Channel

Feature Carried: CSAH No. 15

Location: District 5 - Hennepin County

Bridge Description: The superstructure consists of eight spans of multiple steel girders supporting a reinforced concrete deck. The superstructure is supported by seven steel cast-in-place concrete pipe pile bent piers and two reinforced concrete abutments. The abutments are founded on treated timber piling. The piers are numbered 1 through 7 starting from the south end of the bridge.

2. INSPECTION DATA

Professional Engineer/ Team Leader: Shirley M. Walker, P.E.

Dive Team: Clayton G. Brookins, Michelle D. Koerbel

Date: September 30, 2002

Weather Conditions: Partly Cloudy, "65E F

Underwater Visibility: " 3 Feet

Waterway Velocity: Negligible/None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 through 7

General Shape: Piers 1, 3, 5, and 7 consist of a single row of nine steel pipe, cast-in-place concrete piles. Piers 2, 4, and 6 consist of two rows of five battered steel cast-in-place concrete piles. The piles of each pier support a rectangular reinforced concrete pier cap.

Maximum Water Depth at Substructure Inspected: Approximately 13.4 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap at the west end of Pier 7.

Water Surface: The waterline was approximately 10.5 feet below reference. Waterline Elevation = 931.4.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 7

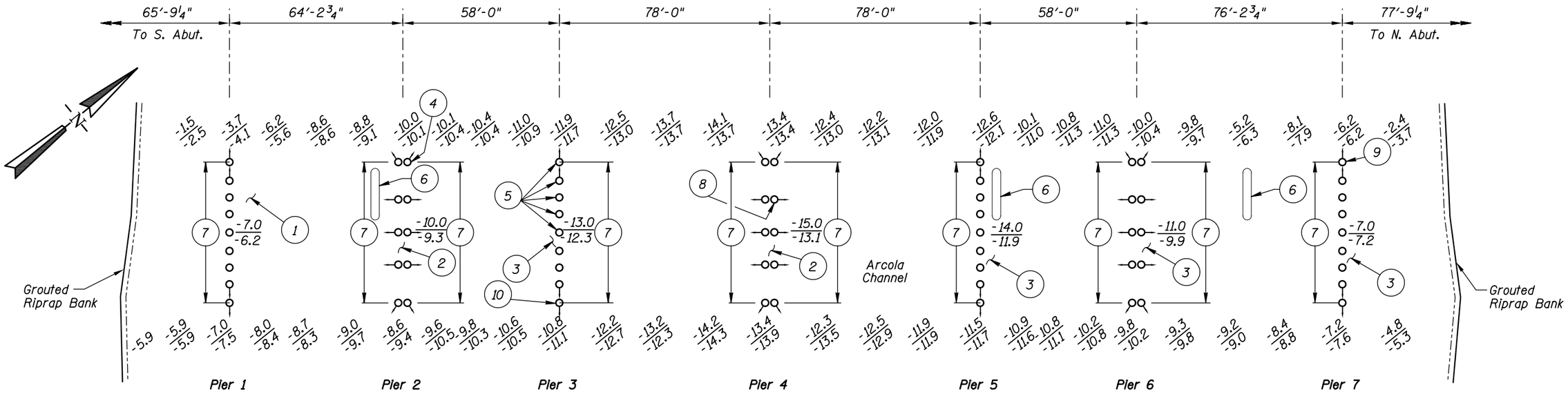
Item 61: Channel and Channel Protection: Code 8

Item 92B: Underwater Inspection: Code B/09/02

Item 113: Scour Critical Bridges: Code I/91

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

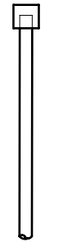
_____ Yes __X__ No



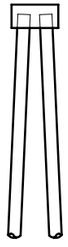
SOUNDING PLAN

INSPECTION NOTES:

1. The channel bottom around Pier 1 consisted of firm sand with 3 inches of maximum probe rod penetration.
2. The channel bottom around Piers 2 and 4 consisted of gravel approximately 1 to 2 inches in diameter.
3. The channel bottom around Piers 3, 5, 6 and 7 and between the piers consisted of silty sand and scattered rocks up to 2 feet in diameter.
4. The steel pipe pile casing exhibited a dent that was 4 inches in diameter with 2 inches of penetration and was located 5 feet below the waterline on the northwest pile of Pier 2.
5. Five steel pipe pile casings at the west end of Pier 3 exhibited dents that were 12 inches long with 1 inch of penetration and were located 5 to 7 feet below the waterline.
6. Abandoned concrete piers were encountered near Piers 2, 5, and 7 and extended approximately 1 foot above the waterline.
7. The steel pipe pile casings typically exhibited light to moderate surface corrosion with minor pitting up to 1/8 inch deep from 1 foot above to 1 foot below the waterline.
8. The steel pipe pile casing exhibited a dent 3 feet above the waterline that was 8 inches in diameter with 1/2 inch of penetration. A second 12 inch diameter dent was observed at 2 feet below the waterline, with 5 inches of penetration.
9. The concrete pile cap exhibited areas of section loss approximately 1.5 feet long and 6 inches high on the west end with exposed reinforcing steel on the top and bottom edges.
10. The concrete repair to the pile cap at the east end of Pier 3 exhibited a crack extending from the top to the bottom of the pile cap on the south face.



TYPICAL END VIEW OF PIERS 1, 3, 5 & 7



TYPICAL END VIEW OF PIERS 2, 4 & 6

GENERAL NOTES:

1. Piers 1 through 7 were inspected underwater.
2. At the time of inspection on September 30, 2002, the waterline was located approximately 10.5 feet below the top of the west end of Pier 7. This corresponds to a waterline elevation of 931.4 based on the previous report dated September 16, 1997.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

Legend

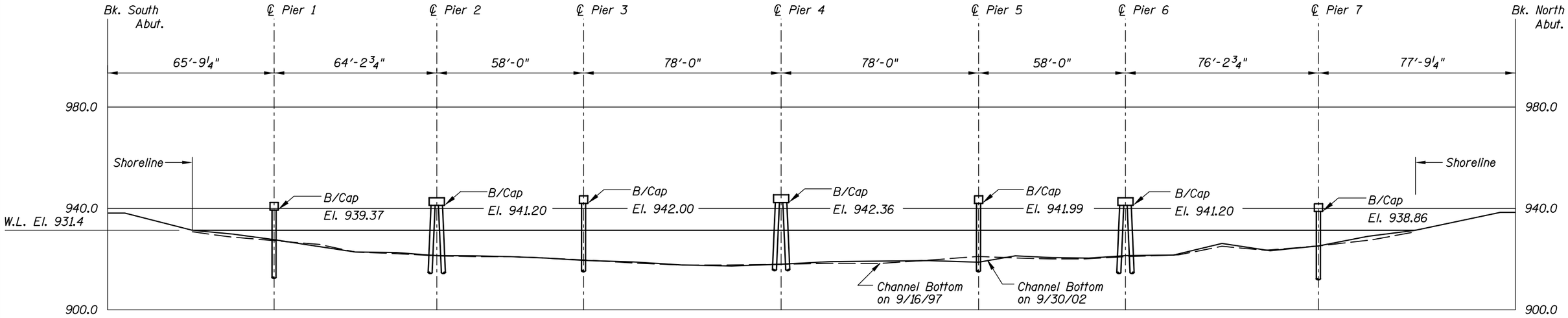
-2.0	Sounding Depth from Waterline (9/30/02)
-5.2	Sounding Depth from Waterline (9/16/97)
○	CIP Concrete Pipe Pile
○—	CIP Concrete Battered Pipe Pile

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

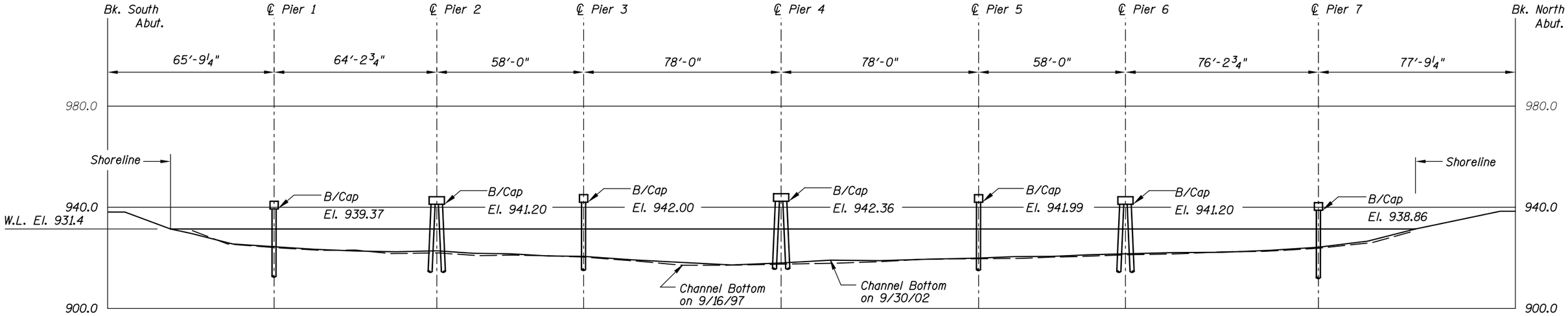
STRUCTURE NO. 27510
OVER THE ARCOLA CHANNEL
DISTRICT 5, HENNEPIN COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: PRH	COLLINS ENGINEERS, INC.	Date: SEPT. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS
Code: 35120112		Figure No.: 1



WEST FASCIA PROFILE



EAST FASCIA PROFILE

Note:

Refer to Figure 1 for General Notes.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

STRUCTURE NO. 27510
OVER THE ARCOLA CHANNEL
DISTRICT 5, HENNEPIN COUNTY

WEST AND EAST
FASCIA PROFILES

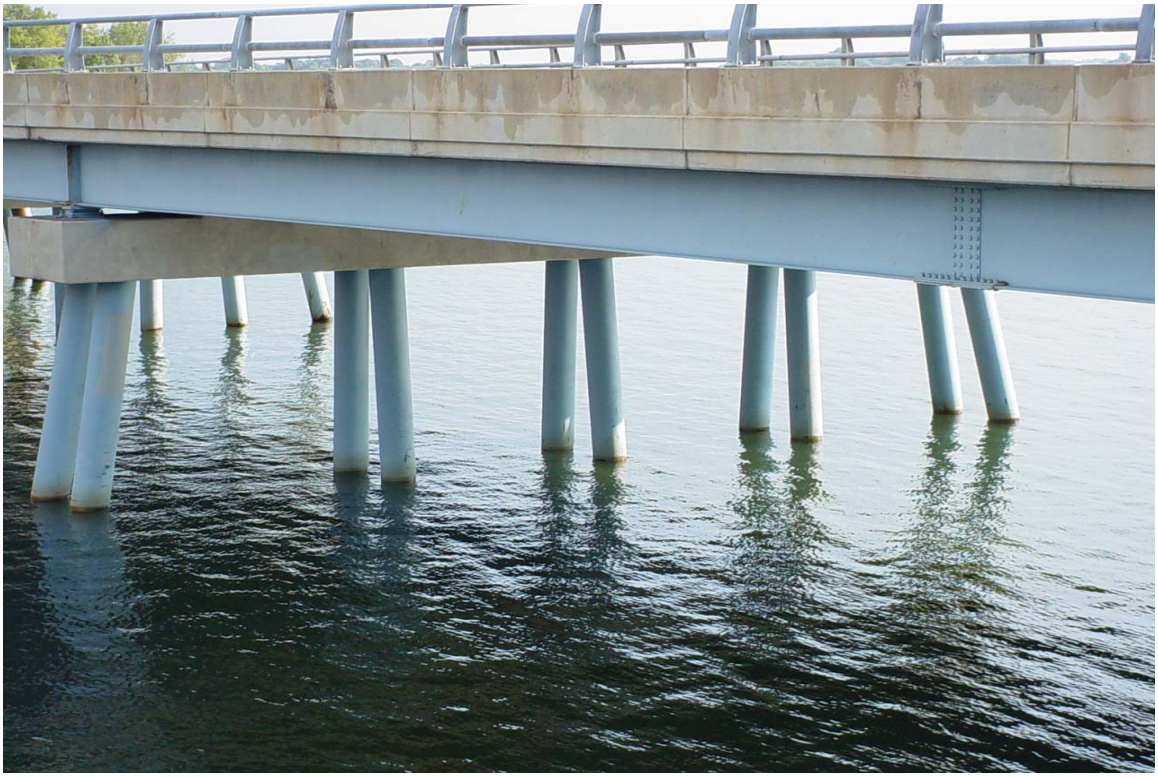
Drawn By: PRH	**COLLINS ENGINEERS, INC.**	Date: SEPT. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: 1"=40'
Code: 35120112		Figure No.: 2

Photograph 1. Overall View of the Structure, Looking Northeast.

Photograph 2. View of Pier 1, Looking North.

Photograph 3. View of Pier 2, Looking Northeast.

Photograph 4. View of Pier 3, Looking Northeast.



Photograph 5. View of Pier 4, Looking Northeast.

Photograph 6. View of Pier 5, Looking Northeast.

Photograph 7. View of Pier 6, Looking Northeast.

Photograph 8. View of Pier 7, Looking Northeast.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: September 30, 2002

ON-SITE TEAM LEADER: Shirley M. Walker, P.E.

BRIDGE NO: 27510 WEATHER: Cloudy, "65E F

WATERWAY CROSSED: The Arcola Channel

DIVING OPERATION: X SCUBA SURFACE SUPPLIED AIR

OTHER

PERSONNEL: Clayton G. Brookins, Michelle D. Koerbel

EQUIPMENT: Scuba, U/W Light, Scraper, Sounding Pole, Lead Line, Probe Rod, Camera

TIME IN WATER: 8:30 a.m.

TIME OUT OF WATER: 9:45 a.m.

WATERWAY DATA: VELOCITY Negligible/None

VISIBILITY "3 feet

DEPTH 13.4 feet maximum at Pier 4

ELEMENTS INSPECTED: Piers 1 through 7

REMARKS: Overall, the piers were in good condition with no defects of structural significance observed. The steel pipe pile casings exhibited light to moderate corrosion from 1 foot above to 1 foot below the waterline with minor pitting up to 1/8 inch deep. Several of the piles exhibited minor dents above and/or below the waterline. The previously noted areas of section loss at the east end of the concrete pile caps at Piers 2, 3, and 4 have been repaired. The concrete repair at Pier 3 exhibited a vertical crack extending from the top to the bottom of the pile cap. The west end of the pile cap at Pier 7 exhibited areas of section loss with exposed reinforcing steel. The channel bottom at the bridge appeared stable with no significant scour or change since the last inspection.

FURTHER ACTION NEEDED: _____ YES ___X___ NO

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 27510
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Shirley M. Walker, P.E.
WATERWAY CROSSED The Arcola Channel

INSPECTION DATE September 30, 2002

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

			SUBSTRUCTURE						CHANNEL					GENERAL					
UNIT REFERENCE NO.		MAXIMUM DEPTH OF WATER	PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE (CAP)	OTHER
	UNIT DESCRIPTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 1	7.0’	7	N	N	9	N	7	8	N	N	N	8	N	7	N	7	N	N
	Pier 2	10.0’	7	N	N	9	N	7	8	N	N	N	8	N	7	N	7	8	N
	Pier 3	11.9’	7	N	N	9	N	7	8	N	N	N	8	N	7	N	7	7	N
	Pier 4	13.4’	7	N	N	9	N	7	8	N	N	N	8	N	7	N	7	8	N
	Pier 5	12.6’	7	N	N	9	N	7	8	N	N	N	8	N	7	N	7	N	N

*UNDERWATER PORTION ONLY

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NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 27510
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Shirley M. Walker, P.E.
WATERWAY CROSSED The Arcola Channel

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UNIT REFERENCE NO.		MAXIMUM DEPTH OF WATER	PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE (CAP)	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
	UNIT DESCRIPTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 6	10.0’	7	N	N	9	N	7	8	N	N	N	8	N	7	N	7	N	N
	Pier 7	7.2’	7	N	N	9	N	7	8	N	N	N	8	6	7	N	7	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the piers were in good condition with no defects of structural significance observed. The steel pipe pile casings exhibited light to moderate corrosion from 1 foot above to 1 foot below the waterline with minor pitting up to 1/8 inch deep. Several of the piles exhibited minor dents above and/or below the waterline. The previously noted areas of section loss at the east end of the concrete pile caps at Piers 2, 3, and 4 have been repaired. The concrete repair at Pier 3 exhibited a vertical crack extending from the top to the bottom of the pile cap. The west end of the pile cap at Pier 7 exhibited areas of section loss with exposed reinforcing steel. The channel bottom at the bridge appeared stable with no significant scour or changes since the previous inspection.

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